CLAIMS

1. A process for mask-free localized grafting of organic molecules capable of being electrically activated, onto a composite surface comprising conductive and/or semiconductive portions, by placing said organic molecules in contact with said composite surface, in which said grafting is performed electrochemically in a single step on chosen, defined areas of said conductive and/or semiconductive portions, said areas being brought to a potential higher than or equal to a threshold electrical potential determined relative to a reference electrode, said threshold electrical potential being the potential above which grafting of said organic molecules takes place.

2. The process as claimed in claim 1, in which the composite surface consists of a paving of materials of different nature.

3. The process as claimed in claim 2, in which the materials of different nature differ in at least one of the following parameters: electronic work function under vacuum, solvation of the surface with an electrolysis solvent, Brönsted acidity in the electrolysis solvent.

4. The process as claimed in any one of claims 1 to 3, in which the composite surface is a semiconductive surface, for example of silicon, doped according to a given topology.

5. The process as claimed in any one of claims 1 to 4, in which the composite surface is a surface consisting of a semiconductor, such as silicon, onto which is deposited another semiconductor.

6. The process as claimed in any one of claims 1 to 4, in which the composite surface is a surface consisting of a semiconductor and a metal.

7. The process as claimed in any one of claims 1 to 3, in which the composite surface is a surface consisting of two different metals.

8. The process as claimed in any one of claims 1 to 3, in which the composite surface is the surface obtained by effecting the contact between a conductive or semiconductive object and a conductive or semiconductive surface.

9. The process as claimed in claim 8, wherein the object is a nanoobject.

10. The process as claimed in claim 9, wherein the nanoobject is a nanotube.

11. The process as claimed in any one of claims 1 to 4, in which said composite surface is a surface of silicon and gold or of silicon dioxide and gold.

12. The process as claimed in claim 1, in which said organic molecules are chosen from electrograftable molecules and electrocleavable molecules.

13. The process as claimed in claim 12, in which said electrocleavable molecules are chosen from diazonium salts, phosphonium salts, sulfonium salts, carboxylic acid salts, aryl acetates, aliphatic alcohols and amines.

14. The process as claimed in claim 12, in which said electrograftable molecules are chosen from the vinyl monomers of formula B-R-A, in which R is a group bearing a vinyl double bond, A is an electron-withdrawing or electron-donating functional group, and B is any functional group, for example a group bearing a function that it is desired to give to the final polymer obtained from said monomers; the molecules comprising at least one strained ring; the functionalized monomers derived from said monomers and molecules; and mixtures of said monomers and molecules.

15. The process as claimed in claim 14, in which said monomer is a monomer whose polymer is electrograftable by cathodic polymerization, chosen from acrylonitrile, methacrylonitrile, para-chlorostyrene, 4-vinylpyridine, alkyl methacrylates such as methyl methacrylate, ethyl methacrylate and butyl methacrylate, and cyano acrylates.

16. The process as claimed in claim 14, in which said monomer is a monomer that may be initiated by anodic polarization, chosen from 4-vinylpyridine and N-vinyl-pyrrolidone.

17. The process as claimed in claim 14, in which said molecule comprising at least one strained ring is a molecule which may be opened by nucleophilic or electrophilic attack, preferably chosen from molecules containing an epoxy group and oxiranes.

18. The process as claimed in claim 1, in which said grafted organic molecules constitute a grafted organic film forming an electrochemically insulating area.

19. The process as claimed in claim 1, in which said organic molecules have, prior to their grafting, particular properties, for example chemical or physical properties such as polarity, or optical or magnetic properties, and form a localized deposit having said properties.

20. The process as claimed in claim 1, in which the locally grafted organic film formed by the organic molecules is subsequently functionalized or modified to give it particular properties, for example chemical, physical, optical or magnetic properties, that it did not have at the start.

21. The process as claimed in claim 20, in which the organic film is a film of electrografted polyacrylonitrile which is subsequently cured to make it electrically conductive and a good candidate for lubrication.

22. The process as claimed in claim 20, in which the locally grafted organic film is doped, for example, with silver salts which may then be revealed with a photographic developer.

23. The process as claimed in claim 1, in which said organic molecule is methacrylonitrile and the grafting is performed by means of a potential scan over said surface with a threshold potential from -2.3 to -2.8 V/(Ag^+/Ag) and preferably -2.4 V/(Ag^+/Ag).

24. The process as claimed in any one of claims 1 to 23, in which the composite surface is chosen from the surfaces of microelectronic circuits, such as biochips, microsensors and "lab-on-chips", and the surfaces of microfluidics devices, of micromechanical components and of fine jewelry components.

25. A composite surface comprising composite portions and/or semiconductive portions onto which are locally electrografted organic molecules on defined chosen areas of said conductive and/or semiconductive portions.

26. The composite surface as claimed in claim 25, which is chosen from the surfaces of microelectronic circuits, such as biochips, microsensors and "lab-on-chips", and the surfaces of microfluidics devices, of micromechanical components and of fine jewelry components.

27. The composite surface as claimed in claim 25 or claim 26, in which microstructuring or nanostructuring is combined with a chemical nature of the deposit.

28. The composite surface as claimed in claim 27, which is a self-cleaning or demisting surface.

29. A microelectronic circuit, such as a biochip, microsensor or "lab-on-chip" circuit, comprising a composite surface as claimed in any one of claims 25 to 27.

30. A microfluidics device comprising a composite surface as claimed in any one of claims 25 to 27.

31. A micromechanical component or fine jewelry component comprising a composite surface as claimed in any one of claims 25 to 27.

32. The use the composite surface as claimed in any one of claims 25 to 27 in microelectronics, for example in inkjet printer heads, electronic sensors that may be used in vivo, biochips, microfluidics, and lab-on-chips.